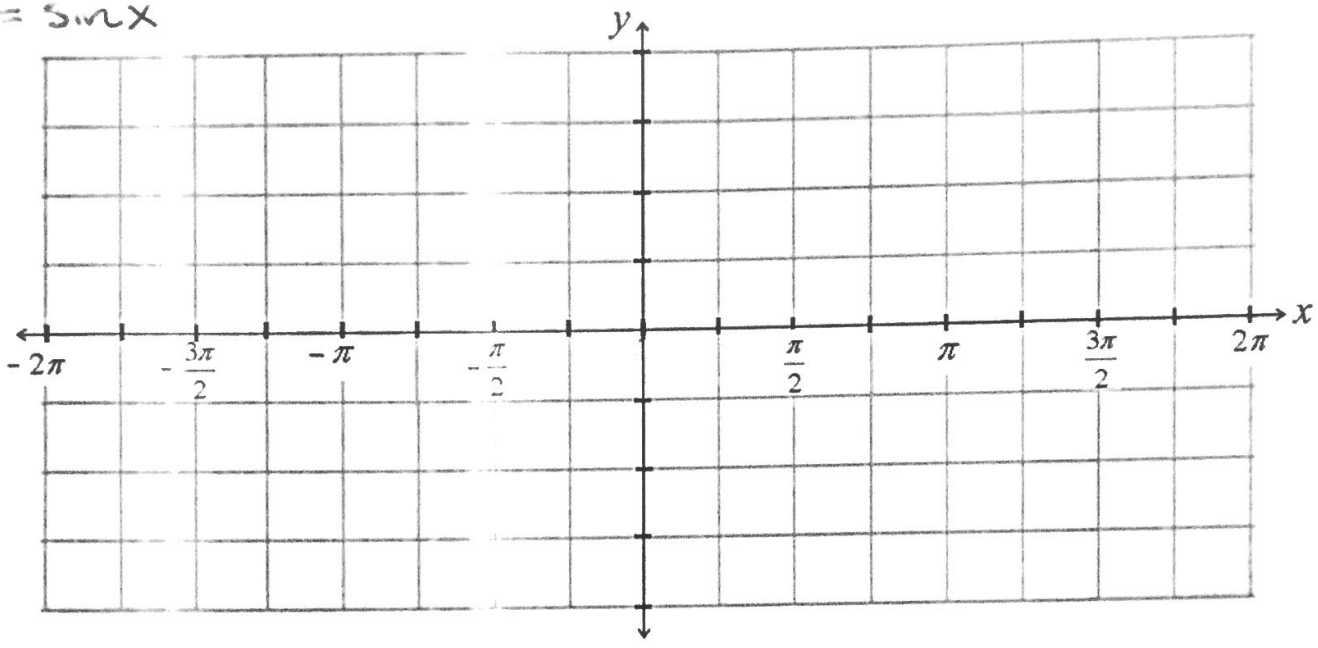
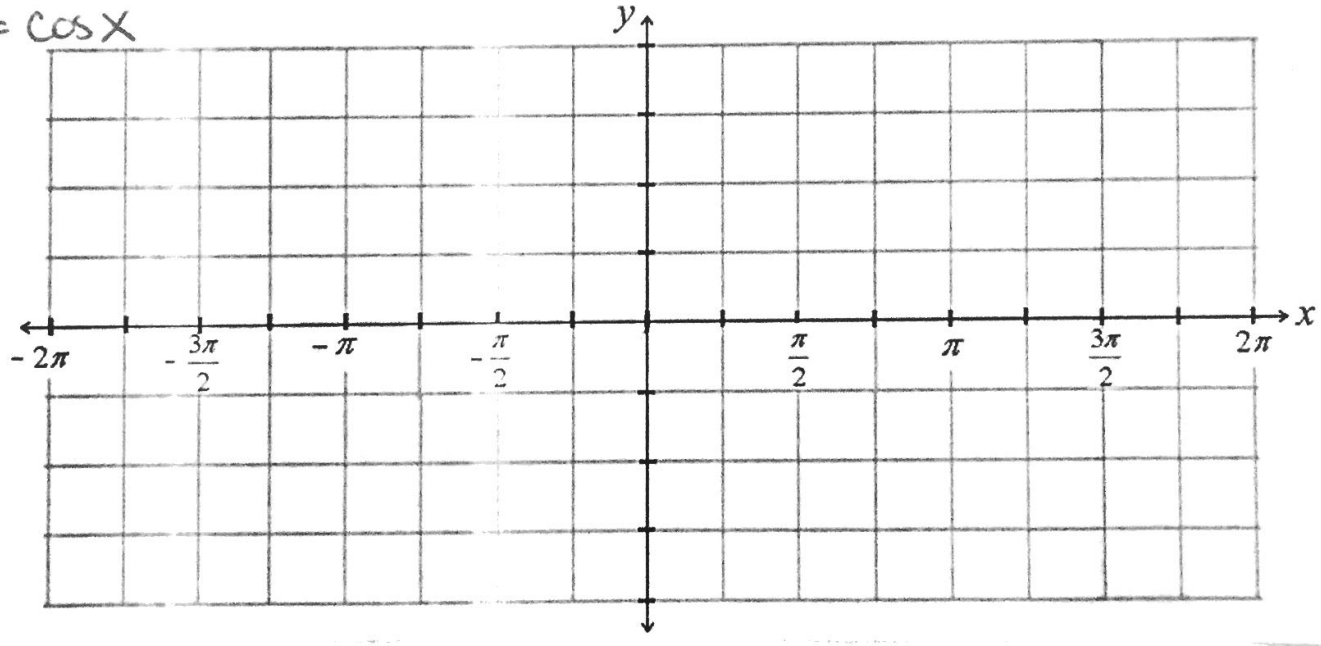
Name _____

Notes - Graphing Sine and Cosine

$f(x) = \sin x$



$f(x) = \cos x$

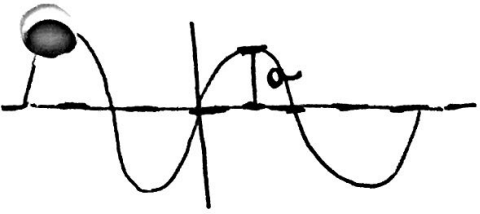


Skill Building

In Problems 9–18, if necessary, refer to a graph to answer each question.

9. What is the y-intercept of $y = \sin x$?
10. What is the y-intercept of $y = \cos x$?
11. For what numbers x, $-\pi \le x \le \pi$, is the graph of $y = \sin x$ increasing?
12. For what numbers x, $-\pi \le x \le \pi$, is the graph of $y = \cos x$ decreasing?
13. What is the largest value of $y = \sin x$?
14. What is the smallest value of $y = \cos x$?
15. For what numbers x, $0 \le x \le 2\pi$, does $\sin x = 0$?
16. For what numbers x, $0 \le x \le 2\pi$, does $\cos x = 0$?
17. For what numbers x, $-2\pi \le x \le 2\pi$, does $\sin x = 1$? Where does $\sin x = -1$?
18. For what numbers x, $-2\pi \le x \le 2\pi$, does $\cos x = 1$? Where does $\cos x = -1$?

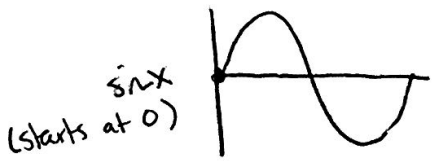
Notes - Periodic Functions + Transformations

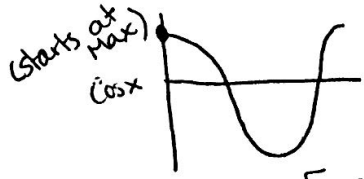


→ **Midline** - the horizontal line that is used as the reference line about which the wave oscillates

Amplitude - height of wave from peak to midline
↳ can never be negative!

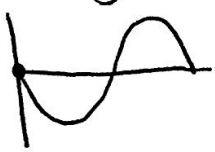
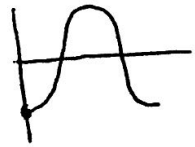
Period - The minimum x-value required for the function to repeat itself





$y = a\sin[b(x - c)] + d$ $y = a\cos[b(x - c)] + d$

(a) → If a is negative, the graph reflects over the x-axis

$-\sin x$  $-\cos x$ 

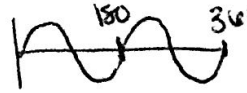
→ $|a|$ = amplitude - changes height

(b) → Tells us the # cycles in 360°

→ Period = $\frac{360^\circ}{b}$ or Radians - Period = $\frac{2\pi}{b}$

Ex: $y = \sin 2x$
↳ $b = 2$
go through 2 cycles in 360°

Period = $\frac{360}{2} = 180^\circ$



(c) → shifts the graph horizontally. Called "phase shift" (L, R)

(d) → Shifts the graph (midline) up and down